Index

Isotopes and Radiation Technology

Volume 9

The page range for each of the four issues of Vol. 9 is as follows:

No. 1, pages 1 to 128
No. 2, pages 129 to 252
No. 3, pages 253 to 374
No. 4, pages 375 to 525

A

Accelerators
  production of Russian design, patent-sharing agreement for, 365
Aerosols
  composition of marine and continent, determination by activation analysis, 162–66
Agriculture
  hydroponic beds for, radiotracer determination of flow rate of, 60–62
  nuclear techniques in, 477
  use of radioisotopes in, 523
  seed irradiator for use in, 112
Air
  ionization in air conditioning, ^{241}Am use for, 124
  pollution by automobile emissions, use of ^{14}C as tracer for studying, 63–64
  pollution particulates in, neutron activation analysis of, 53–55
Aircraft
  landing of, nuclear guidance system for, 523
  lift capacity of helicopter, radiometric indicator for, 124
  Mach speed of, radioisotope-based meter for measuring, 407
Aluminum
  determination in air-pollution particulates by neutron activation analysis, 54–55
  determination in cement by neutron activation analysis, 51–52
  determination in the chromium-concentration process by neutron activation analysis, 49–52
  determination by neutron activation analysis using the SHERLOCK III irradiator, 29
Americium-241
  availability, 122
  production in commercial power reactors, 129–33
  use to increase air ionization in air conditioning, 124
Americium-243
  production in commercial power reactors, 129–33
Animals
  mineral metabolism in domestic, nuclear techniques for studying, 525
Antimony
  determination in air-pollution particulates by neutron activation analysis, 54–55
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Antimony-122
  AEC production withdrawal, 120
Antimony-124
  use in beryllium ore analysis, 267–68
Argon
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Arsenic
  determination in air-pollution particulates by neutron activation analysis, 54–55
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Art
  (see Paintings)
Asbestos–cement mixtures
  nondestructive testing by gamma radiography, 7
Asphalt
  quality control in highway construction, radiometric techniques for, 21–23
Association Internationale d'Irradiation Industrielle
  establishment of, 365
Atmosphere
  diffusion studies of, use of ^{85}Kr in, 65–71
  precipitation scavenging, 370
Atomic Energy of Canada Limited
  ^{60}Co-irradiator sales, 120
  radioisotope research and development program of, critical study of, 364
Atomic Energy Research Establishment
  isotope information services, 361
Automobiles
  smog formation from emissions from, use of ^{14}C as tracer for studies of, 63–64
  manufacture of, nuclear techniques for product inspection and quality assurance during, 385–92

B

Bacteria
  detection in blood cultures, automated radiometric method for, 240–43
Barium
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Barium-131
  AEC production withdrawal, 120
Barium-133
  AEC production withdrawal, 120
Barium-135^{m}
  use in bone scanning, 353
Batteries (chemical)
  comparison with other power systems for underseas applications, 235–37
Batteries (radioisotope-powered)
  development for wristwatches, 365
Benzene, ethyl
  production from n-octane, use of ^{99}Tc as a catalyst in, 181
Beryllium
  determination in ores, neutron activation instrument for, 267–68
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Beta radiography
  use in detection of watermarks and other structures in paper, 467
Bibliographies
  on isotope separation by ion exchange, 369
  on radioisotope-powered generators, 234
  on radiation preservation of fruits and vegetables, 201
  on separation, analytical determinations, and applications of stable isotopes, 153
Biology
  use of cyclotrons in, 371–72
  use of radioisotopes in, 113
Bismuth
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Bismuth-205
  production in the LAMPF, 109–12
Bismuth-206
  production in the LAMPF, 109–12
Bismuth-210
  AEC production withdrawal, 120
Blast furnaces
  operation of, 8–12
  operation of, use of radioisotopes for control of, 12–19
Blood
  bacterial growth in cultures of, automated radiometric instrument for detection of, 240–43

This index was prepared by Theodore F. Davis of AEC's Division of Technical Information Extension, Oak Ridge, Tenn.

Index

Isotopes and Radiation Technology

Volume 9

The page range for each of the four issues of Vol. 9 is as follows:

No. 1, pages 1 to 128
No. 2, pages 129 to 252
No. 3, pages 253 to 374
No. 4, pages 375 to 525

A

Accelerators
  production of Russian design, patent-sharing agreement for, 365
Aerosols
  composition of marine and continent, determination by activation analysis, 162–66
Agriculture
  hydroponic beds for, radiotracer determination of flow rate of, 60–62
  nuclear techniques in, 477
  use of radioisotopes in, 523
  seed irradiator for use in, 112
Air
  ionization in air conditioning, ^{241}Am use for, 124
  pollution by automobile emissions, use of ^{14}C as tracer for studying, 63–64
  pollution particulates in, neutron activation analysis of, 53–55
Aircraft
  landing of, nuclear guidance system for, 523
  lift capacity of helicopter, radiometric indicator for, 124
  Mach speed of, radioisotope-based meter for measuring, 407
Aluminum
  determination in air-pollution particulates by neutron activation analysis, 54–55
  determination in cement by neutron activation analysis, 51–52
  determination in the chromium-concentration process by neutron activation analysis, 49–52
  determination by neutron activation analysis using the SHERLOCK III irradiator, 29
Americium-241
  availability, 122
  production in commercial power reactors, 129–33
  use to increase air ionization in air conditioning, 124
Americium-243
  production in commercial power reactors, 129–33
Animals
  mineral metabolism in domestic, nuclear techniques for studying, 525
Antimony
  determination in air-pollution particulates by neutron activation analysis, 54–55
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Antimony-122
  AEC production withdrawal, 120
Antimony-124
  use in beryllium ore analysis, 267–68
Argon
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Arsenic
  determination in air-pollution particulates by neutron activation analysis, 54–55
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Art
  (see Paintings)
Asbestos–cement mixtures
  nondestructive testing by gamma radiography, 7
Asphalt
  quality control in highway construction, radiometric techniques for, 21–23
Association Internationale d'Irradiation Industrielle
  establishment of, 365
Atmosphere
  diffusion studies of, use of ^{85}Kr in, 65–71
  precipitation scavenging, 370
Atomic Energy of Canada Limited
  ^{60}Co-irradiator sales, 120
  radioisotope research and development program of, critical study of, 364
Atomic Energy Research Establishment
  isotope information services, 361
Automobiles
  smog formation from emissions from, use of ^{14}C as tracer for studies of, 63–64
  manufacture of, nuclear techniques for product inspection and quality assurance during, 385–92

B

Bacteria
  detection in blood cultures, automated radiometric method for, 240–43
Barium
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Barium-131
  AEC production withdrawal, 120
Barium-133
  AEC production withdrawal, 120
Barium-135^{m}
  use in bone scanning, 353
Batteries (chemical)
  comparison with other power systems for underseas applications, 235–37
Batteries (radioisotope-powered)
  development for wristwatches, 365
Benzene, ethyl
  production from n-octane, use of ^{99}Tc as a catalyst in, 181
Beryllium
  determination in ores, neutron activation instrument for, 267–68
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Beta radiography
  use in detection of watermarks and other structures in paper, 467
Bibliographies
  on isotope separation by ion exchange, 369
  on radioisotope-powered generators, 234
  on radiation preservation of fruits and vegetables, 201
  on separation, analytical determinations, and applications of stable isotopes, 153
Biology
  use of cyclotrons in, 371–72
  use of radioisotopes in, 113
Bismuth
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Bismuth-205
  production in the LAMPF, 109–12
Bismuth-206
  production in the LAMPF, 109–12
Bismuth-210
  AEC production withdrawal, 120
Blast furnaces
  operation of, 8–12
  operation of, use of radioisotopes for control of, 12–19
Blood
  bacterial growth in cultures of, automated radiometric instrument for detection of, 240–43

This index was prepared by Theodore F. Davis of AEC's Division of Technical Information Extension, Oak Ridge, Tenn.

Bone scanning
use of ^{133m}Ba in, 353
Boron
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Bromine
determination in air-pollution particulates by neutron activation analysis, 54–55
Bullet lead
identification by neutron activation analysis, 39–40
Bureau Eurisotop
review of activities of, 423

C

Cadmium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
purification of electromagnetically separated isotopes of, 133–37
Cadmium-109
availability, 122
Cadmium telluride
preparation of single crystals of, 444–47, 456–59
Calcium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
uptake by burrs of subterranean clover, radiotracer study of, 346
Californium-252
availability, 122, 247
availability of solid wire, 515
needles of, donation of, to IAEA, 517
use as neutron radiography source, evaluation of, 396–404
use in exploration of ocean bottom for minerals, 264–66
uses in industry, meeting on, 516–17
uses of, progress report No. 9 on, 523
Canada
approval of irradiated food, status of, 186
use of radioisotopes in, 118–19
Carbon
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Carbon-14
AEC production withdrawal, 120
production in commercial power reactors, 375–78
Catalysts
^{99}Tc, use in re-forming of petroleum fractions, 181
Cement
analysis for Al and Si by neutron activation analysis, 51–52
Cement–asbestos mixtures
nondestructive testing by gamma radiography, 7
Cerium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Cesium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Cesium-131
AEC production withdrawal, 120
Cesium-134
production in commercial power reactors, 375–78
Cesium-137
production in commercial power reactors, 375–78
Chemistry
use of cyclotrons in, 371–72
use of radioisotopically labeled analytical reagents in organic, 524
Chlorine
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
purification of electromagnetically separated isotopes of, 137–39
Chlorine-36
AEC production withdrawal, 120
Chromium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the chromium-concentration process by neutron activation analysis, 49–52
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Chromium ores
beneficiation, process control by activation analysis using radioisotopic neutron sources, 49–52
Civil engineering
use of radiation and isotope techniques in, review of conference on, 5–8
Clover
calcium uptake by burrs of subterranean, radiotracer study of, 346
Coatings
electron curing of, state of the art, 1970, 78–91
thickness measurement of, review of beta backscattering method for, 368
Cobalt
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Cobalt-56
production in the LAMPF, 109–12
Cobalt-57
availability, 122
Cobalt-60
loan program, 247
production in commercial power reactors, 129–33, 375–78
use as heat source in thermoelectric generators, evaluation of, 230–34
Concrete
moisture content, determination by neutron-scattering technique, 7
quality control in highway construction, radiometric techniques for, 21–23
Concrete–plastic combinations
development and testing programs for, review of conference papers on, 6–7
Conferences and meetings
on industrial uses of ^{252}Cf, 516–17
on medical applications of semiconductor radiation detectors, 124
on neutron sources, 209–14, 248
on nuclear medicine, 125
on nuclear science, index to, 250
on plastics in packaging, 249
on radiopreservation of seafoods, 295–99
on radiation and isotopic techniques in civil engineering, 5–8
on sterile-male technique for control of fruit flies, 243
on use of radioisotopes in agriculture, 523
on uses of cyclotrons in biology, chemistry and metallurgy, 371–72
Copper
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
determination by X-ray-fluorescence analysis, 176–79
Copper-67
AEC production withdrawal, 120
Criminology
(see Forensic science)
Curium-242
production in commercial power reactors, 129–33
Curium-244
production in commercial power reactors, 129–33, 375–78
Cyclotrons
^{123}I production in, evaluation of nuclear reactions for, 154–59
use in biology, chemistry and metallurgy, 371–72

D

Denmark
approval of irradiated food, status of, 186
Densimeters
(see Gages (nuclear))
Diffusion
solid-state, radiometric method for detection, 414–18
Diseases
X-ray therapy of nontumorous, 364
Dunite
neutron activation analysis, 183–84
Dysprosium
determination in the SHERLOCK III NAA unit, sensitivity for, 30

E

Ear
vibrations in, measurement by Mössbauer technique, 483
Electric motors
operating temperatures of, use of ^{85}Kr for measuring, 414
Electrons
use in curing of coatings, state of the art, 1970, 78–91
Engineering (civil)
use of radiation and isotope techniques in, review of conference on, 5–8
Engineering Materials List
availability, 250
Environment
monitoring of Idaho, for metallic poisons, 524
pollution by automobile emissions, use of ^{14}C as tracer for studying, 63–64
pollution of, isotopes in control of, film on, 517
pollution particulates in, neutron activation analysis of, 53
pollution of, radioisotope gages for measurement of, 257–58
pollution studies, symposium on nuclear techniques for, 181
pollution studies, use of isotopes in, 523
Erbium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Europium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Europium-156
production in the LAMPF, 109–12

Exhibits
"Nuclear USA", 362–63

F

Fats
determination in soft tissue, using ^{109}Cd, 501–4
Films
"Doorway to Diagnosis", 517
"Isotopes in Environmental control", 517
"Nuclear Innovations in Process Control", 517
"Radiation Processing", 517
"Radiation Processing: A New Industry", 517
"Short-Lived Radioisotopes in Nuclear Medicine", 517
"Space and the Atom", 517
"The Atom and the Environment", 516
"The Radioisotope-Powered Cardiac Pacemaker", 517
Finland
use of radioisotopes in, 359–60
Fissionable materials
measurement for nuclear safeguards, review of neutron sources for, 505–9
Fluorine
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Fluorine-18
availability of pyrogen-free, 361
Foods
density of, radiometric gage for measuring, 362
Foods (irradiated)
apple juice, effects studies, 473
approval for human consumption, status of, 186–87
asparagus, effects studies, 472
beef, effects of phosphate treatment on, 288–91
beef, effects studies, 292–94
betel leaf, effects studies, 477
blueberries, effects studies, 472–73
bread, use by Apollo astronauts, 124–25
cherries, effects studies, 473
citrus fruits, effects studies, 194–96
codfish, effects studies, 471–72
commercial development of, 72
corn, effects studies, 473
Eurisotop publications on, 433–34
fish, conference on, 295–302
fruits and vegetables, bibliography on, 201
German evaluation of, 73–74
lobster tails, effects studies, 468–70
mangoes, effects studies, 198
mushrooms, effects studies, 303–5, 473–74
onions, wholesomeness studies, 192–93
oranges, effects studies, 74
oysters, effects studies, 76–77
peaches, effects studies, 74, 196–97, 473
potatoes, wholesomeness studies, 191–92
seafood, conference on, 295–302
shrimp, effects studies, 470
shrimp, report on shipping studies, 201
strawberries, effects studies, 74, 473
strawberries, shipping studies of, 475–76
symposium on, 519
tomatoes, effects studies, 74, 198–99
wheat, wholesomeness studies, 189–91
Forensic science
bullet lead identification by neutron activation analysis, 39–40
detection of materials removed from an industrial plant using radioactive tracers, 166
gunpowder-residue detection by neutron activation analysis, 40
paint identification by neutron activation analysis, 269–71
paper identification by neutron activation analysis, 39
use of neutron activation analysis in, 370
use of neutron activation analysis in, review of, 379–81
Forests
radioisotopic monitor for rime accumulation in, 182–84
Frost
(see Rime)
Fruit flies
sterile-male technique for control of, meeting on, 243
Fuel cells
comparison with other power systems for underseas applications, 235–37

G

Gadolinium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Gages (nuclear)
for determination of moisture in materials, 7, 21–23, 277, 361
Eurisotop publications on, 425–28
film on, 517
for measurement and control of pollution, 278–79
for measuring density of materials in the food industry, 362
for measuring density of soils, 21–23, 185, 277
for measuring dust emission from various plants, 7
for measuring levels of liquids, availability of, 362
for measuring Mach number, 407
for measuring solid matter in water, 7
for measuring the thickness of hot metals, errors in, 405–7
for measuring thickness of materials, 7, 362
for measuring thickness of materials, availability of, 362
for measuring thickness of materials, design with automatic fire safety shutter closing device, 413
for moisture content, 515
for monitoring environmental pollution, 257–58
for monitoring rime accumulation in forests, 182–84
principles and techniques of alpha-particle, 460–64
review of industrial, 256–57
Gallium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Gallium-72
AEC production withdrawal, 120
Gamma radiography
availability of "Industrex" system for, 516
availability of portable unit for, 120–21
evaluation of ^{169}Yb and ^{175}Yb mixtures for, 422
use in nondestructive testing of asbestos-cement mixtures, 7
use in testing of construction materials, 7
Gases
distribution in containers, radiotracer technique for measurement of, 419
Genes
synthesis of, role of ^{32}P and ^{33}P in, 115–17
Geology
use of x-ray-fluorescence spectrometry in, 434–43
Germanium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Gold
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Gold-111
AEC production withdrawal, 120
Goodwin, James T.
appointment as Director of Southern Interstate Nuclear Board, 519
Gunpowder
residue, detection on gunhand by neutron activation analysis, 40
Gulf Radiation Technology
activation analysis program, 393–95

H

Hafnium
determination by neutron activation analysis using the SHERLOCK III irradiator, 27–29
Heart (radioisotope-powered)
development of ^{238}Pu heat source for, 248
development of $^{238}PuO_2$ heat source for, 255–56
German program for, 518
Heart pacemaker (radioisotope-powered)
comparison of ^{147}Pm and ^{238}Pu fueled, using thermoelectric, thermionic, and betavoltaic energy-conversion systems, 215–22
development of ^{147}Pm fueled, 255
development of subminiature, for placement inside the heart, 229
European approval of free travel for persons wearing, 248
film on, 517
French market for, survey of, 518
Japanese development program for, 518
licensing by AEC, 517
life extension by getter-produced vacuum in, 124
safety features of the French Alcatel–Medtronic, 222–28
Helicopters
lift capacity, radiometric indicator for, 31–33
Heliotropin
synthesis of, radiation process for, 319
Helium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Highways
construction of, use of nuclear systems in, 21–23
Hoarfrost
(see Rime)
Holmium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Hydrocarbons
heterogeneous catalytic-exchange reactions in, use of ^{2}H and ^{3}H as tracers for studying, 447–52
Hydrogen
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Hydrology
nuclear well logging in, 369

Hydroponic beds
radiotracer determination of flow rates in, 60–62

I

Indium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
purification of electromagnetically separated isotopes of, 139–41
Insects
control or eradication by radiation, 368, 370
Iodine
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Iodine-123
production in cyclotrons, evaluation of nuclear reactions for, 154–59
Iodine-124
production in the LAMPF, 109–12
Iodine-125
use in dental x rays for identification of mass disaster victims, 354
Iodine-130
AEC production withdrawal, 120
Iodine-131
production techniques, 522
Ion exchange
isotope separation by, bibliography on, 369
Iridium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Iridium-149
AEC production withdrawal, 120
Iron
determination by X-ray-fluorescence analysis, 176–79
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
production in blast furnaces, use of radioisotopes for control of, 8–19
Iron-55
availability, 122
Iron ores
on-line determination of Si in, by neutron activation analysis, 167–72
Irradiation facilities
gamma, description Australian agricultural, 514
gamma, description of British, 512
gamma, description of Casaccia pilot, 318
gamma, description of "double-cell" laboratory plant, 202
gamma, description of Ezeiza plant, 208
gamma, description of French Lisa and Irpa, 511
gamma, description of large unicell plant, 204
gamma, description of NBS remote-handling systems for ^{60}Co, 482
gamma, description of Polish-type 180-LG, 510–11
gamma, description of Puerto Rico ^{137}Cs, 480–81
gamma, description of Rodona plant for sterilization of medical supplies, 204–7
gamma, description of small unicell plant, 203
gamma, description of USSR LMB, 321–11
gamma, description of USSR RKh, 322
gamma, description of USSR RKhUND-2000, 510
gamma, description of USSR UGU-200, 513
gamma, for medical supplies in Australia, 248
gamma, for seeds, 112, 246
International Nutronics, Inc., availability of services from, 361–62
Isotopes Information Center
publications of, 373–74
termination of, 361
Israel
approval of irradiated food, status of, 186
training courses on radiation engineering, 361

K

Krypton
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Krypton-85
use in leak detector, 362
use in static-elimination devices, license exemption for, 248

L

Labeled compounds
symposium on, 520
Lakes
mineralization of sediments in, radiometric method for measuring, 500
Land mines
location of, use of neutron activation in, 184
Lanthanides
recovery from SRP wastes by solvent extraction, 1–4
Lanthanum
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Lasers
use in construction activities, 7–8
Lead
determination by X-ray-fluorescence analysis, 179
determination in paint, X-ray-fluorescence analyzer for, 271–72
determination in the SHERLOCK III NAA unit, sensitivity for, 30
identification of bullet, neutron activation method for, 39–40
Leak detectors
development of ^{85}Kr, 362
Life sciences
symposium on nuclear activation techniques in, 246
use of radioisotopes in, 113
Light sources
availability of ^{3}H, 519–20
Liquids
level of, radiometric gage for measuring, 362
Lithium
determination in the SHERLOCK III NAA units, sensitivity for, 30
Los Alamos Meson Physics Facility
description, 105–7
production of radioisotopes for isotopic neutron sources, 107–12
Luminescent materials
(see Light sources)
Lutetium
determination in the SHERLOCK III NAA unit, sensitivity for, 30

M

Mach number
radioisotope-based meter for measuring, 407
Man
book: "Biological Effects of Radiation", 520–21
Magnesium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Manganese
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Marine environment
interaction of radioactive contaminants with constituents of, symposium on, 367–68
Massachusetts Institute of Technology
training course on nuclear medicine, 366–67
Medical supplies
gamma-irradiation plant for sterilization of, 204–7
radiosterilization plant in Australia, 248
Medicine (nuclear)
application and production of radioisotopes for use in, 253–55
book: "Diagnostic Nuclear Medicine," 371
conference on, 125
film on, 517
M.I.T. course on, 366–67
role of nuclear engineering in, review of, 485–97
short-lived radioisotopes in, film on, 517
training manual, 243
use of radioisotopes in, 113
use of radioisotopes in clinical diagnosis, symposium on, 246
Medtronic Inc.
construction of animal research facility, 365
Mercury
absorption and excretion in mice, effects of synthetic resin on, 347
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Metal industry
use of radioisotopes in, symposium on, 367
Metals
thickness of hot, errors in radiometric measurements of, 405–7
Metallurgy
use of cyclotrons in, 371–72
Methylmethacrylate polymers
radiotracer study of acidic hydrolysis of, 56–57
Microorganisms
detection in blood cultures, automated radiometric method for, 240–43
genetic improvement of industrial, symposium on, 249
Minerals
detection on ocean floors, use of ^{252}Cf in, 264–66
exploration and exploitation, nuclear techniques for, 372

neutron activation analysis, description of SHERLOCK III irradiator for use in, 23–30
Mining industry
nonferrous, use of X-ray-fluorescence analysis in, 173–80
Moisture
determination of, nuclear gages for, 7, 21–23, 277, 361
Molybdenum
determination by neutron activation analysis using the SHERLOCK III irradiator, 29
determination by X-ray-fluorescence analysis, 176
Moon rock
radiometric studies of, 64–65, 443
Mössbauer resonant detector
characteristics and design parameters for, 371
Mössbauer technique
use in measurement of ear vibrations, 483

N

Neodymium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Neon
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Nerves
stimulator for phrenic, radioisotope-powered, 500
Netherlands
approval of irradiated foods, status of, 186–87
Neutron activation analysis
description of SHERLOCK III neutron irradiator for use in the mineral industries, 23–30
gamma-ray energies for, tables of, 371
Gulf Radiation Technology work on, 393–95
use in aerosol analysis, 163
use in air pollution studies, 53–55, 63–64
use in beryllium-ore analysis, 267–68
use in cement analysis, 51–52
use in chrome-concentration-process control, 49–51
use in construction activities, 7
use in determination of proteins in food, 351–53
use in forensic science, 39–40, 166, 269–71, 379–81, 522–23
use in in situ analysis of ocean-floor materials, 183–84
use in life sciences, symposium on, 246
use in locating land mines, 184
use in marine aerosol analysis, 163
use in on-line measurement of Si in iron-ore slurries, 167–72
use in pollution monitoring, 257
use of ^{252}Cf in, for detection of minerals on ocean floors, 264–66
use of radioisotopic neutron sources for, 48–53
use in titanium dioxide (pigment) analysis, 51–53
Neutron radiography
design parameters of Atomics International L-48 Reactor for, 41–44
use of ^{252}Cf in, 396–404
Neutron sources
^{241}Am–Be, characteristics of, 48–49
^{252}Cf, characteristics of, 48–49
^{242}Cm–Be, characteristics of, 48–49
^{244}Cm–Be, characteristics of, 48–49
conference on, 248
description of SHERLOCK III, 23–30
isotopic, production from the LAMPF, 105–12
^{238}Pu–Be, characteristics of, 48–49
review of, 209–14
^{124}Sb–Be, characteristics of, 48–49
shipping container for, 247
use in nuclear safeguards, review of, 505–9
Nickel
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Nickel-63
AEC production withdrawal, 120
Niobium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Nitrogen
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Nuclear batteries
development for wristwatches, 365
Nuclear engineering
role in nuclear medicine, review, 485–97
Nuclear reactions
for production of ^{123}I in cyclotrons, evaluation of, 154–59
Nuclear safeguards
use of neutron sources for in-plant measurement of fissionable materials in, review of, 505–9
Nuclear technology
book: "Man and Atom, Building a New World Through Nuclear Technology", 522

O

Oak Ridge National Laboratory
highlights of the 1960s, 122–23
Oceans
detection of minerals on floors of, use of ^{252}Cf in, 264–66
floor materials, in situ analysis by neutron activation, 183–84
transport of particulates into the atmosphere from, radiotracer studies of, 163–66
Oil slicks
identification of, use of neutron activation analysis for, 257, 524
Ores
neutron activation analysis, description of SHERLOCK III irradiator for use in, 23–30
Osmium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Osmium-191
AEC production withdrawal, 120
Oxygen
determination in the SHERLOCK III NAA unit, sensitivity for, 30
O-Xylene
production from n-octane, use of ^{99}Tc as a catalyst in, 181

P

Paints
electron curing of, state of the art, 1970, 78–91
identification in crime detection, neutron activation analysis method for, 269–71
lead content of, X-ray-fluorescence analyzer for, 271–77
Paintings
identification by neutron activation analysis, 522–23
Palladium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
purification of electromagnetically separated isotopes of, 141–43
Palladium-109
AEC production withdrawal, 120
Paper
beta radiography of watermarks and other structures in, 467
identification by neutron activation analysis, 39
Paper mills
effluents from, radiation-induced oxidation of, at high pressure, 101–4
Particulates
neutron activation analysis, 53–55
size determination, X-ray-fluorescence method for, 278
Patents
review of U. S. process radiation, 308–17
Perfume
(see Heliotropin and Vanillin)
Petroleum
fractions of, use of ^{99}Tc as catalyst for re-forming of, 181
Phosphorus
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Phosphorus-32
use in gene synthesis, 115–17
Phosphorus-33
use in gene synthesis, 115–17
Photographic film-emulsions
thickness of, measurement by neutron activation, 467
Photon activation analysis
use in marine aerosol analysis, 163
Phrenic nerve
radioisotope-powered stimulator for, 500
Plants
protein improvement in, nuclear techniques for, 369–70
Plastic–concrete combinations
development and testing programs for, review of conference papers on, 6–7
Plastic–wood combinations
Eurisotop publications on, 429–32
production by Canadian companies, 517–18
review of conference papers on, 7
Plastics
radiation processing, 370
Platinum
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Plutonium-238
production in commercial power reactors, 129–33, 375–78
Plutonium oxide ($^{238}Pu^{16}O_2$)
development as fuel for artificial heart, 255–56
Pollution
measurement and control of, use of radioisotopic instruments for, 278–79
monitoring and control of, nuclear gages for, 257–58
symposium on nuclear techniques for studying environmental, 181
Polonium-210
production in commercial power reactors, 375–78
use in static-elimination devices, license exemption for, 248

Polymerization
  review of basic research on radiation-induced ionic, 478–80
Polymers
  radiation grafting to inorganic substrates, 94–97
Polymethylmethacrylate
  radiotracer study of acidic hydrolysis of, 56–57
Potassium
  determination in air-pollution particulates by neutron activation analysis, 54–55
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
  purification of electromagnetically separated isotopes of, 143–46
Praseodymium
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Praseodymium-142
  AEC production withdrawal, 120
Precipitation
  in-cloud scavenging processes during, measurement of short-lived cosmogenic radionuclides for studying, 421
Process radiation
  review of U. S. patents on, 308–17
Promethium-147
  production in commercial power reactors, 375–78
  recovery from Savannah River Plant wastes, 1–4
  use as fuel for heart pacemaker, 255
Proteins
  content in plants, nuclear techniques for improvement of, 370
  determination in food by neutron activation analysis, 351–53
Protons
  use in marine aerosol analysis, 163
Pumps
  discharge rates of, radiotracer method for measuring, 36–37

R

Radiation
  book: "Biological Effects of Radiation", 520–21
Radiation detectors
  availability of high-purity germanium, 121–22
  development of new and improved, 257
Radiation detectors (semiconductor)
  medical applications of, 124
  Si(Li), use in X-ray-fluorescence analysis in nonferrous mining industry, 173–80
Radiation Dynamics, Inc.
  sales agency for Vickers products in U. S., Canada, and Mexico, 121
Radiation processing
  film on, 517
  review of U. S. patents on, 308–17
Radiation protection
  basic criteria for, 523
  biological aspects of, symposium on, 521–22
Radiation sources
  (see also Neutron sources)
  specifications of high activity gamma, 523
  standard, report on needs for, 58–59
Radioactive materials
  federal regulations for packaging and transportation of, report on, 161
  transportation of, tests on packages for, 368
Radioactive wastes
  management of, symposium on, 345
  recovery of ^{147}Pm from SRP, 1–4
Radiochemical Centre, Amersham, Bucks, England
  catalog, 121
Radiography
  (see also Beta radiography, Gamma radiography, and Neutron radiography)
  book: "Industrial Radiology Techniques", 521
Radioisotope-powered batteries
  development for wristwatches, 365
Radioisotope-powered electric generators
  bibliography and data compilation on, 234
  comparison with other power systems for underseas applications, 235–37
  development for British lighthouse, 124
  GICODYNE, description of, 232–34
  Isotaf-1, development for Polar use, 518
  MAPLE, description of, 231–33
  RTG-1, fifth anniversary of, 364–65
  review of U. S. Navy development program for, 323–29
  SNAP-21, description of, 238–39
  space applications of, film on, 517
  status of U. S., for space applications, 330–40
  status of U. S., for terrestrial and marine applications, 340–44
  TRISTAN, description of, 345
  use of ^{60}Co as heat source in, evaluation of, 230–34
Radioisotope-powered heaters
  development for "Pioneer" spacecraft, 518
Radioisotope-powered heat source
  report on ^{60}Co, 525
Radioisotopes
  (see also specific radioisotopes, e.g., Cobalt-60)
  increase in nonpower uses, 124
  production for medical applications, 253–55
  production of, description of CNEN Mexico City facility for, 523
  production in power reactors, 129–33, 375–78
  production in the LAMPF for isotopic neutron sources, 105–12
  Radiochemical Centre's sales of, 518–19
  use in Canadian industry, 118–19
  use in Finland, 359–60
  use in life sciences, review of, 113
Radiopharmaceuticals
  ^{99m}Tc–DTPA, preparation of, 160
  ^{99m}Tc–HSA, preparation of, 160–61
  symposium on, 520
Radiopreservation
  (see Foods (irradiated))
Radiosterilization
  availability of services from Micro-Gammatrol, 362
  for control of fruit flies, meeting on, 243
  use for insect control or eradication, 368
Radiotracer techniques
  use in atmospheric diffusion studies, 65–71
  use in blast-furnace ironmaking operations, 8–19
  use in detection and measurement of solid-state diffusion, 414–18
  use in detection of materials being removed from industrial plants, 166
  use in leak detection, 7
  use in measurement of wearability of various coatings, 7
  use in measuring discharge rates of high-head turbines and pumps, 36–37
  use in measuring flow rates in hydroponic beds, 60–62
  use in measuring gas distribution in containers, 419
  use in study of acidic hydrolysis of methylmethacrylate polymers, 56–57
  use in studying calcium uptake by clover burrs, 346
  use in studying heterogeneous catalytic-exchange reactions in hydrocarbons, 447–52
  use in studying smog formation from automobile emissions, 63–64
  use in studying transpiration rate in trees, 348–50
  use in studying transport of particulates from the ocean into the atmosphere, 163–66
Reactors (Atomics International L-48)
  description, 41–44
Reactors (power)
  commercial radioisotope production in, 375–78
  comparison with other power systems for underseas applications, 335–37
  production of ^{241}Am, ^{243}Am, ^{60}Co, ^{242}Cm, ^{244}Cm, and ^{238}Pu in, 129–33
Rhenium
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Rhenium-186
  AEC production withdrawal, 120
Rime
  accumulation in forests, radioisotopic monitor for, 182–84
Roads
  (see Highways)
Rocks (moon)
  radiometric studies of, 64–65, 443
Rotation
  radioisotope device for determination of relative, 413
Rubidium
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Rubidium-86
  AEC production withdrawal, 120
Ruthenium
  determination in the SHERLOCK III NAA unit, sensitivity for, 30

S

Samarium
  determination in air-pollution particulates by neutron activation analysis, 54–55
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Samarium-153
  AEC production withdrawal, 120
Sand
  moisture content, determination by neutron-scattering technique, 7
Savannah River Plant
  fuel-processing wastes, recovery of ^{147}Pm from, 1–4
  determination in the SHERLOCK III NAA unit, sensitivity for, 30
Scandium-46
  AEC production withdrawal, 120
Screwworm
  establishment and maintenance of "barrier" along the U. S.–Mexico border, 249
Securities
  protection against forgery of, radiometric method for, 419
Seeds
  irradiation facility for, 246
  small irradiator for, 112

Selenium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Seminars
on radiation quantities, 365
Sewage
radiation-induced oxidation of, at high pressures, 101–4
slime-treatment processes, radioisotopic technique for studying effects of variables in, 244–45
SHERLOCK III neutron irradiator
description and application in the mineral industries, 23–30
Shipping container
for neutron sources, 247
determination in cement by neutron activation analysis, 51–52
Shock-wave-position sensor
development and testing of isotopic, 32–36
Silicon
determination in the chromium-concentration process by neutron activation analysis, 49–52
determination in iron-ore slurries by neutron activation analysis, 167–72
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Silver
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Silver-106*m*
production in the LAMPF, 109–12
Snow
accumulation of, airborne radiometric system for measuring, 37–39
mass determination of, using aerial survey of natural radiation from soil, 409–11
Sodium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Soils
density of, radiometric gage for measuring, 21–23, 185, 277
moisture content, determination by neutron-scattering technique, 7
physicochemical properties of, radioisotopic methods for determination of, 523–24
Solids
diffusion in, radiometric method for detection, 414–18
Solvent extraction
recovery of ^{147}Pm from SRP wastes by, 1–4
Southern Interstate Nuclear Board
Director of, appointment of, 519
Spain
approval of irradiated foods, status of, 187
Stable isotopes
bibliography on separation, analytical determination, and applications of, 153
purification of electromagnetically separated, 133–49
Steel
nondestructive testing by gamma radiography, 7
Strontium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Strontium-90
production in commercial power reactors, 375–78
Sulfates
determination in fresh water, radiometric method for, 44–47
Sulfur
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Sulfur dioxide
stack gas monitor for, 525
Surfaces
area measurement with radioactive preparation, 412
Symposia
(see also Conferences and meetings)
on application of radioisotopes, 367–68
on biological aspects of radiation protection, 521–22
on the assessment of radioactive organ and body burdens, 125
on dosimetry techniques applied to agriculture, industry, biology, and medicine, 249
on dynamic studies with radioisotopes in medicine, 246
on genetic improvement of industrial microorganisms, 249
on the interaction of radioactive contaminants with constituents of the marine environment, 367
on management of radioactive wastes, 345
on new developments in radiopharmaceuticals and labeled compounds, 520
on nuclear activation techniques in the life sciences, 246
on nuclear techniques in environmental pollution, 181
on precipitation scavenging of the atmosphere, 370–71
on radiation legislation and its meaning to the radiologist, 355–58
on radioactive isotopes in scientific research, 185
on radiopreservation of food, 519
on sterility principle for insect control or eradication, 368
on use of nuclear techniques in the basic metal industries, 367
on the use of isotopes and radiation in research on soil–plant relationships, 125
on the use of isotopes in studies on the physiology of domestic animals with special reference to hot climates, 249

T

Tantalum
determination in the SHERLOCK III NAA unit, sensitivity for, 30
purification of electromagnetically separated isotopes of, 146–48
Tantalum-182
AEC production withdrawal, 120
Technetium-99
use as a catalyst in the re-forming of petroleum fractions, 181
Technetium-99*m*
availability of generator for sterile, 515
Technetium-99*m*–DTPA
preparation, 160
Technetium-99*m*–HSA
preparation, 160–61
Tellurium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Tellurium-119*m*
production in the LAMPF, 109–12
Tellurium-125*m*
AEC production withdrawal, 120
Terbium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Terbium-156
production in the LAMPF, 109–12
Textile industry
radioisotope utilization in, Eurisotop publications on, 428–29
Textile mills
effluents from, radiation-induced oxidation of, at high pressure, 101–4
Thallium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Thallium-204
AEC production withdrawal, 120
Thorium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Thulium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Thulium-170
AEC production withdrawal, 120
production in commercial power reactors, 375–78
Thulium-171
AEC production withdrawal, 120
Tin
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Tin ores
borehole probe for in situ assay of, 172
Tissues
fat content of, in vivo analysis using ^{109}Cd, 501–4
Titanium
determination in air-pollution particulates by neutron activation analysis, 54–55
purification of electromagnetically separated isotopes of, 148–49
Titanium dioxide
analysis for Al and Si by neutron activation analysis, 51–52
Titration
review of radiometric, 522
Toluene
production from n-heptane, use of ^{99}Tc as a catalyst in, 181
Tracer techniques
(see Radiotracer techniques)
Training courses
announcement by Oak Ridge Associated Universities, 122
on radiation engineering, 361
Trees
transpiration rate of red pine, tritiated water method for studying, 348–50
Tritium
cancer treatment with, 366
labeled luminous compounds of, radiation hazard from, 366
labeling of biochemicals with, 366
production in commercial power reactors, 375–78
use in static-elimination devices, license exemption for, 248
Tungsten
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Tungsten-185
AEC production withdrawal, 120

Tungsten-188
AEC production withdrawal, 120
Turbines
discharge rates of, radiotracer method for measuring, 36–37

U

Union of Soviet Socialist Republics
approval of irradiated foods, status of, 187
United States
approval of irradiated foods, status of, 187
Uranium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
determination by X-ray-fluorescence analysis, 179–80

V

Vanadium
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Vanadium-48
production in the LAMPF, 109–12
Vanillin
radiation synthesis process for, 319

W

Water
analysis for sulfate, radiometric technique for, 44–47
radiation treatment of Streptomyces contaminated, gamma, 475
Water (waste)
radiation-induced oxidation of, at high pressure, 101–4
radiation treatment of, 523
Well logging
radioisotope depth indicator, 412
Wood-plastic combinations
Eurisotop publications on, 429–32
production by Canadian companies, 517–18
review of conference papers on, 7
Wristwatches
radioisotope-powered battery for, 365

X

X-ray emission analyzers
design and applications of, using x-ray and gamma-ray sources, 368–69
X-ray-fluorescence analysis
use in borehole probe for in situ assay of tin ores, 172
use in construction activities, 7
use in field geology in the Galapagos Islands, 434–43
use in measurement of particle size, 278
use in nonferrous mining industry, 173–80
use in pollution monitoring, 257
X-ray-fluorescence analyzers
availability of British, 516
description of portable radioisotope, 385
for measuring lead in paints, 271–72
X-ray-fluorescence sources
availability, 122
X-ray spectrometry
study of particulate heterogeneity effects in radioisotope, 466
X-ray therapy
effects on nontumorous diseases, 364
Xenon
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Xenon-128
production process for, 150–53

Y

Ytterbium
determination in the SHERLOCK III NAA unit, sensitivity for, 30
Yttrium-88
production in the LAMPF, 109–12

Z

Zinc
determination in air-pollution particulates by neutron activation analysis, 54–55
determination in the SHERLOCK III NAA unit, sensitivity for, 30
determination by X-ray-fluorescence analysis, 179
Zirconium
determination in the SHERLOCK III NAA unit, sensitivity for, 30